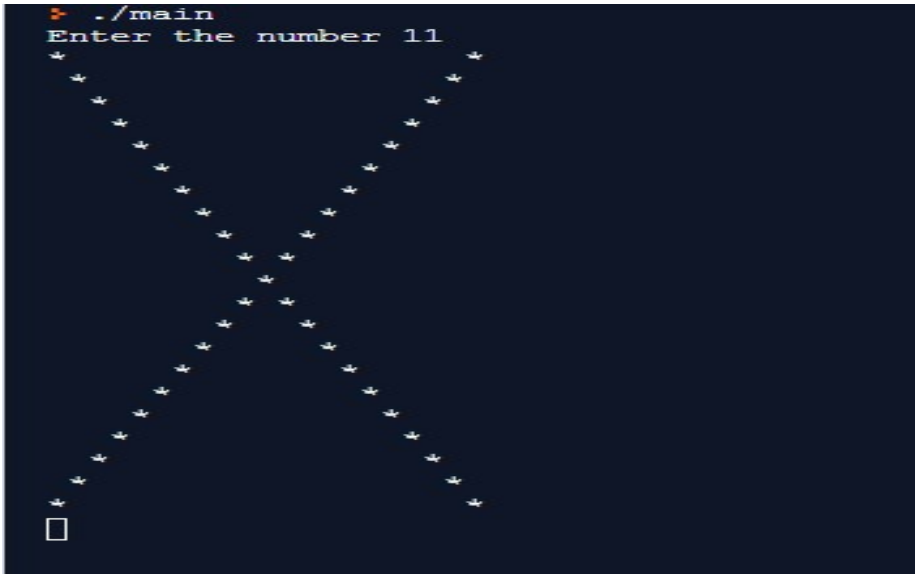
Problem 1: Write a C code to print hollow X- star pattern. The number of columns (N) is taken from test case. For example for N = 6 the output will be.

Solution:

```
#include <stdio.h>
 int main(void) {
 int n,m;
 printf("Enter the number");
 scanf("%d",&n);
 m=2*n-1;
 for(int i=1;i<=m;i++)
 {
         for(int j=1;j<=m;j++)
         {
          if(i==j || j==(m-i+1))
          {
          printf("*");
          }
          else
            {
       printf(" ");
            }
         }
   printf("\n");
 }
 return 0;
}
```

Output:



Problem 2: Complete the C program which takes size of the array and array elements as input and puts the prime and composite elements of the array in two separate arrays (according to their occurrence in the input array) .

Solution:

```
#include<stdio.h>
int isPrime(int num);
int main()
{
 int i,j;
printf("\nEnter a number :");
int num;
scanf("%d",&num);
if(isPrime(num))
 printf("Prime Detected");
else
 printf("NON PRIME");
}
int isPrime(int num)
{
 int i;
 int flagPrime =1;
 if(num ==1)
  return 0;
 for(i=2;i < num;i++)
 {
  if(num%i == 0)
    flagPrime =0;
 }
 return flagPrime;
}// end isPrime
```

Private Test cases used for evaluation	Input	Expected Output	Actual Output	Status
Test Case 1	10 6 78 23 49 56 31 51 76 6 5	Elements of Prime array: 23 31 5 \n Elements of Composite array: 6 78 49 56 51 76 6	Elements of Prime array: 23 31 5 \n Elements of Composite array: 6 78 49 56 51 76 6	Passed

Problem 3: Write a C program to print the Record of the Student Merit wise. Here a structure variable is defined which contains student rollno, name and score.

Solution: This is c program that ask user to sort student data merit wise.

1. Declaring variables.
2. Using loop Statement.
3. Print out the result on the screen.

Code:

```
#include<stdio.h>
struct student
{
        int rollno;
        char name[20];
        char college[40];
        int score;
};
void main()
   {
        struct student s[20],temp;
        int i,j,n;
        clrscr();
        printf("\nEnter no. of Students : ");
        scanf("%d",&n);
        printf("\nEnter the rollno,name,college name,score ");
        for(i=0;i<n;i++)
        scanf("%d%s%s%d",&s[i].rollno,s[i].name,s[i].college,&s[i].score);
        for(i=0;i<=n-1;i++)
        {
         for(j=0;j<=n-1;j++)
         {
            if(s[j].score<s[j+1].score)
            {
              temp=s[j];
              s[j]=s[j+1];
              s[j+1]=temp;
            }
         }
        }
        printf("\nThe Merit List is :\n");
        for(j=0;j<n;j++)
        printf("%d\t%s\t%s\t%d\n",s[j].rollno,s[j].name,s[j].college,s[j].score);
        getch();
       }
```

Problem 4: Point out the error in the program and explain the solution

Code 1:

Answer: Error: Not allowed assignment

Explanation: The function void f() is not visible to the compiler while going through main() function. So we have to declare this prototype void f(); before to main() function. This kind of error will not occur in modern compilers.

Code 2:

Answer: Error: return statement cannot be used with conditional operators

Explanation: In a ternary operator, we cannot use the return statement. The ternary operator requires expressions but not code.

1. Actually function is declared only once inside the main().
2. Before the main() here we defined the function.
3. An function can be declared anywhere in the program with one condition that it is declared (i.e. Give prototype) before calling.

Here function is declared inside the main but following the above condition that declaration is before calling.

We can't declare an function after the calling which will give you error as function should have a prototype.